Observations at Rivas, Nicaragua, July, 1898.

OBSERVATIONS AT 7 A. M. LOCAL (8 A. M. EASTERN STANDARD) TIME.

Date.	Temperature.		Wind.		Upper clouds.			Lower clouds.			Daily rainfall.
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.	
	°	°									
1	78	74	se.	0	.....	.....	.....	n.	10	se.	0.00
2	75	73	se.	1	.....	.....	.....	n.	10	se.	1.42
3	76	74	se.	0	.....	.....	.....	n.	10	se.	0.40
4	77	73	ne.	0	.....	.....	.....	ks.	10	se.	0.00
5	77	73	ne.	1	cs.	2	se.	.....	.....	.....	0.00
6	76	74	sw.	0	.....	.....	.....	ks.	5	sw.	0.00
7	77	73	sw.	0	.....	.....	.....	n.	10	sw.	1.97
8	75	74	se.	0	.....	.....	.....	ks.	10	se.	0.00
9	75	74	sw.	0	.....	.....	.....	ks.	5	sw.	0.78
10	75	74	sw.	0	.....	.....	.....	ks.	10	sw.	0.40
11	74	71	sw.	0	.....	.....	.....	ks.	10	sw.	0.00
12	76	74	s.	0	.....	.....	.....	ks.	10	s.	0.00
13	75.5	72	sw.	0	.....	.....	.....	ks.	10	s.	0.00
14	76	73	s.	0	ck.	5	ne.	.....	.....	.....	0.00
15	78	73	se.	0	.....	.....	.....	k.	9	se.	0.00
16	78	73	se.	0	.....	.....	.....	k.	8	se.	0.00
17	79.5	71	se.	0	.....	.....	.....	k.	10	se.	1.18
18	79	76	s.	1	.....	.....	.....	k.	9	s.	0.86
19	75	72	se.	2	.....	.....	.....	k.	10	se.	0.18
20	76	70	ne.	0	.....	.....	.....	k.	10	ne.	0.00
21	76	70	ne.	1	.....	.....	.....	n.	10	ne.	0.80
22	77	73	se.	0	.....	.....	.....	ks.	10	se.	0.00
23	76	73	ne.	1	.....	.....	.....	n.	10	se.	0.40
24	77	74	ne.	1	.....	.....	.....	n.	10	ne.	0.00
25	79	75	ne.	2	cs.	10	ne.	ck.	10	ne,	0.20
26	78	75	ne.	1	.....	.....	.....	ks.	10	ne.	0.00
27	77	70	ne.	1	.....	.....	.....	ks.	10	ne.	0.40
28	77	73	e.	1	.....	.....	.....	k.	9	e.	0.00
29	76	73	e.	2	ck.	10	e.	.....	.....	.....	0.00
30	76	73	se.	1	.....	.....	.....	n.	10	se.	*3.86
31	75	73	ne.	0	.....	.....	.....	ks.	10	ne.	0.00
Means ..	76.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.65

21st, light shock of earthquake, 11:55 p.
30th, excessive rain 3.86 inches in fifteen hours;* month, 13.65 inches, mean of eighteen years, 6.455.
*[As Mr. Flint's form credits this rainfall to the twenty-four hours preceding 7 a. m. of the 30th it is doubtful whether his reports adhere to the uniform rule of accrediting rainfall to the a. m. observation at the close of each daily period.—ED.]

OBSERVATIONS AT 8 P. M. LOCAL (9 P. M. EASTERN STANDARD) TIME.

Date.	Temperature.		Wind.		Upper clouds.			Lower clouds.		
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.
	°	°								
1	78	75	se.	0	.....	.....	.....	n.	10	se.
2	.....	73	ne.	1	.....	.....	.....	n.	10	ne.
3	79	72	ne.	1	ck.	0	ne.	.....	.....	.....
4	76	73	ne.	1	ck.	5	ne.	.....	.....	.....
5	78	75	ne.	1	ck.	5	ne.	.....	.....	.....
6	80	76	sw.	0	ck.	10	sw.	.....	.....	.....
7	75	74	sw.	0	ck.	10	sw.	.....	.....	.....
8	78	74	sw.	0	ck.	10	sw.	.....	.....	.....
9	.....	73	sw.	0	.....	.....	.....	ks.	10	sw.
10	76	73	s.	0	.....	.....	.....	ks.	10	s.
11	77	73	s.	0	.....	.....	.....	ks.	10	s.
12	76	73	se.	0	.....	.....	.....	ks.	10	se.
13	79	73	s.	0	.....	.....	.....	ks.	10	s.
14	80	76	se.	0	.....	.....	.....	k.	5	s.
15	80	76	se.	1	.....	.....	.....	k.	8	s.
16	80	76	se.	1	.....	.....	.....	k.	10	se.
17	78	74	se.	0	.....	.....	.....	ks.	10	se.
18	78	74	se.	1	.....	.....	.....	ks.	10	se.
19	78	74	se.	1	.....	.....	.....	ks.	10	se.
20	77	73	ne.	1	.....	.....	.....	ks.	10	ne.
21	77	73	se.	0	.....	.....	.....	k.	5	se.
22	77	74	ne.	0	.....	.....	.....	k.	10	se.
23	80	76	ne.	0	.....	.....	.....	k.	10	se.
24	80	76	ne.	0	.....	.....	.....	k.	Few	ne.
25	80	76	ne.	0	.....	.....	.....	ks.	5	ne.
26	76	73	ne.	1	.....	.....	.....	ks.	10	ne.
27	77	72	e.	1	.....	.....	.....	ks.	10	ne.
28	77	73	e.	1	ck.	7	e.	.....	.....	.....
29	79	73	se.	1	ck.	10	se.	.....	.....	.....
30	76	73	ne.	0	.....	.....	.....	ks.	5	ne.
31	78	74	se.	0	ck.	10	se.	.....	.....	.....
Means	78.2	.....	.....	.....	.....	.....	.....	.....	.....	.....

CLIMATOLOGICAL DATA FOR JAMAICA, W. I.

Through the kindness of Mr. Maxwell Hall, of Montego Bay, Jamaica, the meteorological service of that colony communicates an abstract of the very interesting climatological records of that highly important West Indian service. The climatological summary furnished by Mr. Hall, through his assistant, Mr. Robert Johnstone, of the Meteorological Office, is reproduced in the following table. For descriptive details of the stations and instruments see Vol. XXV, pages 308 and 356.

Montego Bay, where Mr. Maxwell Hall resides, is between 4 and 5 miles west, and also the same distance north of Kempshot Observatory. The location of the latter is N. 18° 24′ 50″, W. 77° 52′ 22″. Stony Hill Reformatory is about 8 miles north of Kingston and within a mile to the west. Hope Gardens is between 3 and 4 miles to the north of Kingston, and about the same distance to the east. From these measurements the latitudes and longitudes given in the following table have been deduced:

Climatological data for Jamaica, W. I.

JUNE, 1898.

	Morant Point Lighthouse.	Negril Point Lighthouse.	Kingston.	Montego Bay.	Castleton Gardens.	Hope Gardens.	Stony Hill Reformatory.	Hill Gardens. (Cin. Planet.)
Latitude	17°56′	18° 16′	17° 58′	18° 30′	18° 12′	18° 02′	18° 06′	18°05′
Longitude	76°10′	78° 23′	76° 48′	77° 57′	76° 50′	76° 46′	76° 49′	76°39′
Elevation (feet)	8	33	50	160	580	600	1,400	4,907
Mean barometer 7 a. m.	29.937	29.937	29.940	29.943	29.964	.....	.....	25.232
Mean barometer 3 p. m.	29.911	29.907	29.898	29.898	29.887	.....	.....	25.210
Mean temperature 7 a. m.	.....	78.6	77.4	75.7	71.7	74.0	73.0	62.1
Mean temperature 3 p. m.	.....	83.1	84.9	83.3	82.7	82.7	80.0	66.2
Mean of maxima	.....	86.8	87.8	86.6	88.1	87.0	85.8	70.0
Mean of minima	.....	73.2	73.1	70.7	67.0	68.0	67.5	58.5
Highest (absolute) maximum	.....	88.8	90.6	88.4	92	90	88	74
Lowest (absolute) minimum	.....	67.9	70.0	68.3	63	64	65	55
Mean dew-point 7 a. m.	.....	71.9	69.5	71.0	69.0	68.4	69.5	56.8
Mean dew-point 3 p. m.	.....	73.5	71.1	73.5	74.3	71.0	74.9	61.8
Mean relative humidity 7 a. m.	.....	80	77	86	88	81	89	81
Mean relative humidity 3 p. m.	.....	73	64	73	75	67	85	85
Monthly rainfall (inches)	4.05	6.07	3.39	5.57	6.52	5.07	5.07	8.73
Average daily wind movement	.....	225.5	61.1	53.9	.....	.....	.....	41.5
Average wind direction 7 a. m.	*	†	n.	ene.	.....	.....	.....	e.
Average wind direction 3 p. m.	e.	e. by s.	se.	ene.	.....	.....	.....	e.
Average hourly velocity 7 a. m.	6.9	7.0	1.2	1.8	.....	.....	.....	.....
Average hourly velocity 3 p. m.	8.6	12.3	5.6	5.0	.....	.....	.....	.....
Average cloudiness (tenths):								
7 a. m. Lower clouds	3.6	1.6	1.3	0.1	.....	.....	.....	.....
7 a. m. Middle clouds	1.8	1.2	0.8	0.2	.....	.....	.....	.....
7 a. m. Upper clouds	0.7	4.6	3.0	4.0	.....	.....	.....	.....
3 p. m. Lower clouds	3.9	5.9	2.2	0.0	.....	.....	.....	.....
3 p. m. Middle clouds	1.7	2.3	1.4	6.1	.....	.....	.....	.....
3 p. m. Upper clouds	0.8	0.9	4.3	2.2	.....	.....	.....	....

*e. by n. †ne. by e.

TORNADO AT HAMPTON BEACH, N. H., JULY 4, 1898.

By ARTHUR E. SWEETLAND (dated August 4, 1898).

The report in the newspapers that a destructive tornado had visited Hampton, N. H., on July 4 led Mr. A. L. Rotch and the writer to visit the scene two days after the storm.

Hampton Beach is situated on the southeastern coast of New Hampshire, 2 miles southeast of Hampton, and near the boundary line of Massachusetts. The country to the northwest and west is covered by numerous small hills varying from 100 to 300 feet in height. In the immediate vicinity of the beach, where the greatest destruction took place, there is a large marsh (Hampton Marsh) on the northwest and west side and the ocean on the east side. The beach extends in a north-northeast to south-southwest direction. The track of the storm was across the marsh from Hampton and from the northwest. The tornado, which occurred at 3:30 p. m., caused its first damage on the road one-half mile southeast of Hampton, where it overturned a large tree, the tree falling in an east-northeast direction. The next damage was in a small orchard, where two small trees were blown down, falling, like the preceding one, from east-northeast. From here

no more damage was observed until the marsh was reached, where haystacks had some of the hay blown toward the east. Leaving the marsh, the tornado then came to the beach, where the most serious damage was done. Large buildings were moved from their foundations and others were blown flat. The western end of the beach was where the greatest destruction took place and it was also the western limit of the tornado's path. At this place almost all the damage was caused by the rear whirl or northwest quadrant of the storm. One building on the extreme western limit of the path had the upper part of the roof badly damaged. Going east, another building had the main part of the house blown flat on the ground, while the laundry or kitchen was uninjured. The main part of the building was carried forward by the wind and the blinds and some of the woodwork were found in a field about 200 feet southeast of the wreck. There was no evidence of an explosive effect on this building.

Another dwelling house near was badly injured in its second story by the fragments of the barn (which was in the rear of the building) being taken up and carried around the northeast corner of the dwelling house toward the southeast. The barn was completely demolished, and the only thing left to mark the place where it stood was the floor. A large square building was moved bodily 10 feet from its foundation toward the southeast. Northeast of this building the rear of a large dwelling was moved 6 feet from its foundation posts and swung around on its southeast corner as a pivot, the plastering and other interior parts of the house being badly damaged. A short distance east of these buildings a tree was overturned toward the east. Farther along the beach toward the east there was a barn blown to the ground and parts of it were carried around a building with some hay that was cocked up by the side of it. The next building was carried forward about three feet on the foundations, which appeared to be uninjured.

About 1,000 feet farther east there were a few trees blown down toward the east. Near the trees there was a skating rink in which there had been a large number of people, and this building had collapsed, killing three and injuring many persons. To the east of the rink a windmill was upset toward the south; 100 feet south of the windmill a barn facing west and east, with large doors open on the west end, had the rear of east end blown out. Parts of the rear end were found about 50 feet southeast of the barn. The shingles were stripped from the roof of the barn in many places, and here one could follow the cracks between the boards from the ridge pole to the gutter, showing that the increased pressure inside the building had blown off the shingles.

The support of an electric arc lamp, a vertical iron pipe on a wooden pole, was bent toward the southeast and the lamp blown completely out of it.

Along the tornado track there were few buildings that did not suffer some damage, most of them losing chimneys or blinds. Telephone, telegraph, and trolley wires were blown down.

The objects thrown down by the tornado did not show the rotary motion in the front and rear as well as if the storm had traversed a forest or orchard. Most of the fallen objects pointed toward the east or east-southeast, indicating that the greatest damage was done in the rear whirl or northwest quadrant.

Most of the eyewitnesses interviewed describe the storm as coming directly from Hampton across the marsh, and one who saw the cloud describes it as turning over and over. No one seemed to have noticed any pendants (more commonly known as a funnel cloud) descending to the ground. It was difficult to get a good description of the clouds or phenomena connected with the tornado, as almost everyone was too rerrified to observe it. A person who saw the cloud from Exeter, 8 miles northwest of the beach, thought there was a large conflagration at the beach, as the light gray part of the cloud resembled smoke. The tornado was preceded by light rain and hail.

The temperature for the northeastern part of the United States from June 29 to July 4 gradually rose above normal, culminating on the 3d with the hottest day at Boston since September 21, 1881. Several of the Weather Bureau stations recorded maximum temperatures of 100°.

On the morning of the 4th the temperature was still considerably above normal, but not so warm as on the 3d. The humidity had increased so that the heat seemed more oppressive. The 8 a. m. weather map of July 4 showed that there was a low area central over the northeast with the lowest pressure, 29.68, at Sydney. A high pressure was central over the Lakes. Over the New England States the isobars were circular and the winds were mostly westerly. South of New England and over the Middle Atlantic States and Ohio Valley the isobars assumed a V shape. Along the trough of the V, thunderstorms had occurred or were at that time prevailing. In the Atlantic Coast States the temperature was quite high. The 80° isotherm ran through almost every station along the Atlantic coast from Halifax to Florida. The lowest temperature was over Lake Superior, where the 50° isotherm extended through Sault Ste. Marie and Duluth. A fall of 20° in twenty-four hours was recorded over the Lakes. Thus, quite a sharp temperature gradient was formed over the northeastern part of the country.

By 8 p. m. the pressure had increased at the center of the low to 29.8, and the low pressure had become a well marked V, extending down the coast as far south as Virginia. The demarkation of the winds were well marked along the trough, the directions being south and southwest on the east side, and west and northwest on the west side. The high pressure over the Lakes had become better defined, with the highest pressure over Lake Superior. At 8 p. m. the cooler weather covered all the Lakes and St. Lawrence Valley, and by the morning of the 5th it covered the entire northeastern part of the country.

During the 4th a series of thunderstorms of more or less severity occurred along the line of the barometric trough and passed off the coast. The Hampton Beach tornado was the northern limit of the line of thunderstorms, as no rain was reported north of there. Farther south, at Beverly, Mass., there was a severe storm, a pleasure steamer being overturned by the wind and several lives lost. In Boston the wind was not excessive, a heavy hailstorm occurring and hailstones fell varying from one-half to one and one-half inch in diameter.

At Blue Hill Observatory[1] the morning was clear with no clouds until 11 a. m., when a few fracto-cumulus formed and continued forming slowly until 1 p. m., at which time lenticular clouds formed very suddenly in all parts of the sky, and the fracto-cumulus became cumulus and increased rapidly in size. At 1:30 p. m. a thunderstorm was observed to form southwest of Blue Hill, and began to increase in size very rapidly, so that by 2 p. m. the cirro-stratus overflow extended some distance northeast of Blue Hill. Thunder was heard at 2:25 p. m., and by 3 p. m. it was raining and hailing hard, the storm continued until 6 p. m. and moved toward the northeast.

[1] Blue Hill is about 55 miles south-southwest from Hampton Beach.